

PATENT COOPERATION TREATY

REC'D 10 MAR 2005

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From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2005/000037

International filing date (day/month/year)
07.01.2005

Priority date (day/month/year)
08.01.2004

International Patent Classification (IPC) or both national classification and IPC
H01L41/09

Applicant
THORLABS, INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2005/000037

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2005/000037

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. ☐ It has not been possible to consider the validity of the priority claim because a copy of the priority document was not available to the ISA at the time that the search was conducted (Rule 17.1). This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.
4. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-13
	No: Claims	
Inventive step (IS)	Yes: Claims	8,10-13
	No: Claims	1-7,9
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Re Item V.

1. The following documents are referred to in this communication:

D1 : JP 01 043074 A (CANON INC), 15 February 1989

D2 : DE 19 33 205 A1 (SIEMENS AG), 7 January 1971

D3 : JP 61 095586 A (NEC CORP), 14 May 1986

2. INDEPENDENT CLAIM 1

- 2.1. The present application does not meet the criteria of Article 33(1) PCT, because the subject matter of claim 1 does not involve an inventive step in the sense of Article 33(3)PCT.

2.1.1. Document D1, which is considered to represent the most relevant state of the art to the subject matter of claim 1, discloses (the references in parentheses applying to this document):
A multi-axis piezoelectric positioner comprising a fixed part, a moveable part positionable in a plane relative to the fixed part, the moveable part comprising a piezoelectric device operable to expand and contract within the plane, and first second and third friction mechanisms fixed to the fixed part operable to selectively exert friction to the movable part such that the movable part may be moved within the plane by selected activation of ones of the friction mechanisms as the piezoelectric device is expanded or contracted (abstract, figure 1).

2.1.2. The subject-matter of independent claim 1 differs from the disclosure of D1 in that :
Instead of the friction mechanisms of the disclosure in D1, the positioner of the present application comprises releasable clamp mechanisms to selectively clamp the piezoelectric device rather than solely exert friction from one side.

2.1.3. The problem to be solved by the present invention may therefore be regarded as providing alternative means for providing the friction between the fixed part

and the piezoelectric movable part.

- 2.1.4.** In view of D2 the solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

Document D2 discloses a piezoelectric linear positioning device working on the principle of providing clamping mechanisms fixed to a fixed portion and a movable part comprising a piezoelectric element. The clamping devices are activated in such a manner to enable movement of the piezoelectric element in the desired direction when it is expanded or contracted (p. 3, para. 3 - p.6, para. 1).

- 2.1.5.** Therefore the features disclosed in D1 and D2 would be combined by the skilled person, without exercise of any inventive skills in order to solve the problem posed. The proposed solution in independent claim 1 thus cannot be considered inventive (Article 33(3) PCT).

- 2.1.6.** For completeness, it is added that the same conclusion would be obtained if starting from D2 as closest prior art (linear motor with clamping mechanism fixed to a base) and extending the linear motion to a multidimensional with the help of the arrangement disclosed in D1.

3. DEPENDENT CLAIMS

- 3.1.** Dependent claims 2-7 and 9 do not contain any features which add anything inventive to the subject-matter of claim 1 (Article 33(3) PCT).

- 3.1.1.** The number and exact arrangement of the piezoelectric elements in claims 2-6 are only slight modifications and alternatives which the person skilled in the art would readily consider to employ without exercise of any inventive skills depending on the particular circumstances confronted with.

- 3.1.2.** Clamping mechanisms where the contraction or expansion of the piezoelectric actuator in one direction causes an expansion or contraction,

respectively, of a flexure member in a direction perpendicular thereto, are known from D3 (abstract and figures), and the person skilled in the art would readily consider this alternative arrangement.

3.1.3. The carrier for attaching an object to be moved of claim 9 is standard practice and does not add anything inventive over claims 1-8 from which it is dependent either.

3.1.4. The subject-matter of claim 12 when dependent on any of the claims mentioned above is obvious, as it is also disclosed in the documents cited, that a certain, predetermined sequence of activation of piezoelectric devices and clamps is required to achieve the desired motion.

3.2. However, the addition of an additional movement in the z-direction in claim 8 by changing the length of the clamping elements while maintaining a clamping force, adding another piezoelectric device spaced apart with a variable distance as in claim 10, or adding a z-axis positioner to the carrier as in claim 11 is not disclosed in or fairly suggested by the prior art. Therefore claims 8, 10, and 11 as well as 9, 12, and 13 when dependent thereon fulfill the requirements of the PCT with regards to inventive activity (Article 33(3) PCT).

4. Industrial applicability is given in the field of positioners such as those claimed in the present application (Article 33(4) PCT).

Re Item VII.

Contrary to the requirements of Rule 5.1 (a)(ii) PCT, the relevant background art disclosed in the documents D1 and D2 is not mentioned in the description, nor are these documents identified therein.